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Backgrounder

NEW REPRODUCTIVE TECHNOLOGIES

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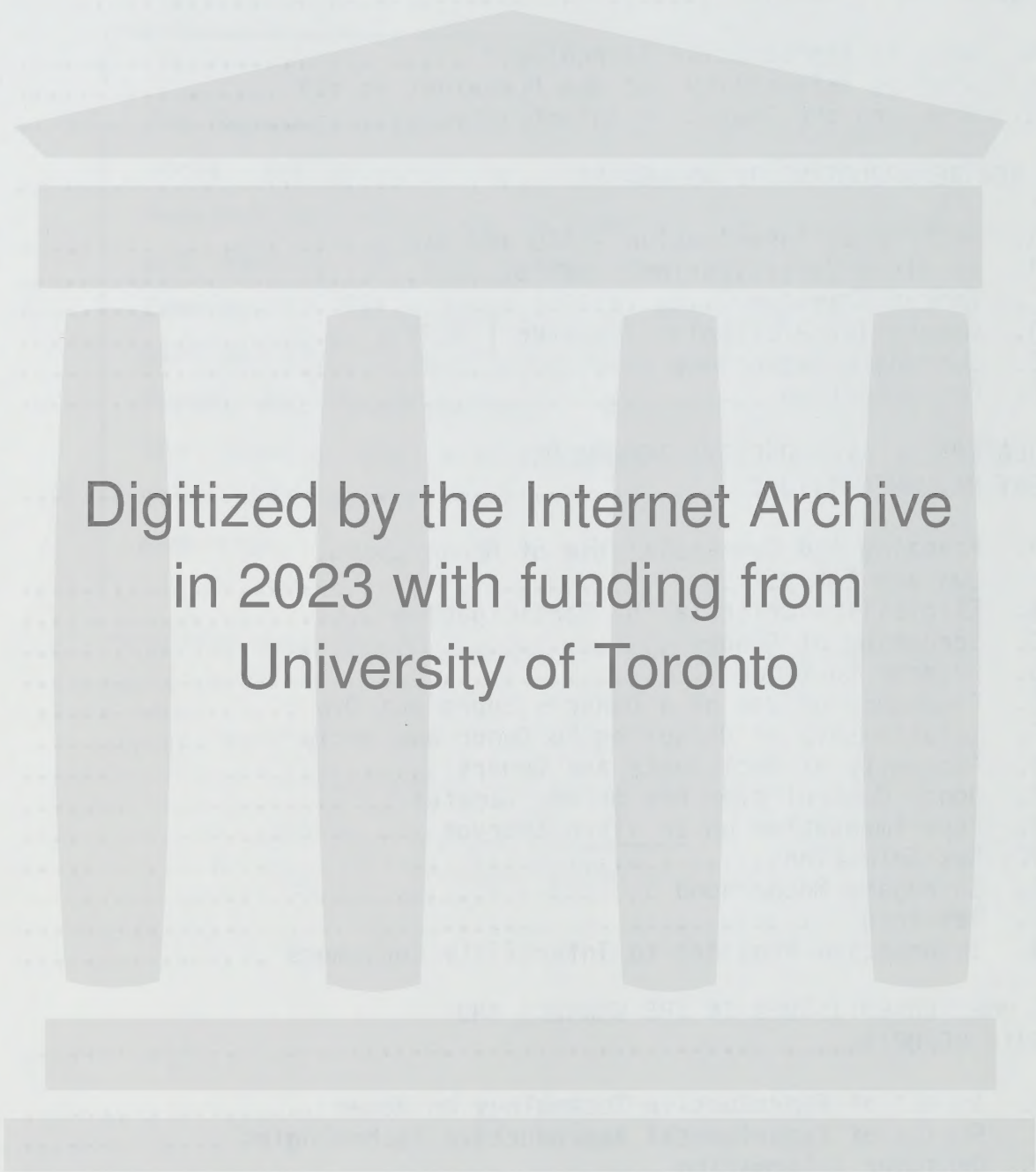

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NEW REPRODUCTIVE TECHNOLOGIES

INTRODUCTION

Since 1977, a coalition of women's groups in Canada, the Canadian Coalition for a Royal Commission on New Reproductive Technologies has called for the establishment of a royal commission "to consider the impact and regulation of new reproductive technologies."(1) According to a spokesperson, a national debate on the advances in reproductive science is essential before any provincial regulations or legislation should be enacted.

Members of the coalition have identified a broad range of issues that would inform such a debate. They include the social effects of reproductive technology; the quality and quantity of information given to reproductive technology "consumers" regarding, inter alia, its physical risks for women and the chances of its success; the commercialization of childbearing through contracts; the "commodification" of human ova, sperm and embryos that can be bought and sold on the market; and judicial control over a woman's quality of life during pregnancy. Among the infertility treatments of particular concern to the coalition are in vitro fertilization and surrogate motherhood.

At present, there are minimal government guidelines and standards regulating reproductive technology in Canada. The Canadian Coalition for a Royal Commission on New Reproductive Technologies advocates the development of national standards to govern its use. A spokesperson

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(1) D. Wilson, "Royal Commission on Reproduction Sought," Globe and Mail (Toronto), 29 March 1988.

for the coalition has cautioned that "if different provinces pass a patchwork of laws dealing with reproductive technology ... the effect would be 'reproductive tourism,' where individuals unable to obtain a particular treatment in one province would simply go to another one."(2)

On 14 March 1989, Barbara McDougall, the minister responsible for the status of women, indicated that the government "shares the concerns" of the coalition of women's groups that a study is required to assess the effects of reproductive technology and the potential commercialization of human life on society and on women.(3) And, on 3 April 1989, the federal government announced in its Throne Speech that it would set up a royal commission of inquiry to study the various reproductive technologies and their associated impacts. Canada will thus join a growing number of countries that have established national reviews of these practices during the 1980s.

A. What is Reproductive Technology?

Reproductive technology addresses a range of reproductive problems and covers a broad spectrum of therapeutic procedures that include contraception, prenatal diagnostic tests, abortion, and techniques to overcome infertility and assist conception. This paper focuses on these last techniques, that is, on medical and non-medical interventions developed to treat infertility or to prevent the transmission of genetic diseases to a couple's offspring.

The "new" reproductive technologies, as they are often called, provide the means to conceive a child bypassing sexual intercourse. These technologies make it possible to separate genetic, gestational and nurturant parenting; that is, it is possible that a child could have five different "parents" - the man and the woman who donate their semen and egg (genetic parents), the carrying mother or surrogate

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(2) Ibid.

(3) S. Delacourt, "Ottawa to Study New Reproduction Issues," Globe and Mail (Toronto), 15 March 1989.

(gestational parent), and the man and the woman who raise the child (social or nurturant parents).

The infertility therapies are, in the main, medical treatments for infertility offered by private practitioners and in clinic settings in hospitals and in health science centres. Since the provision of medical services in Canada is a provincial responsibility, any regulation or control over the technologies would be mostly within provincial jurisdiction.

B. What is Infertility and How Prevalent is it?

Infertility is a state of involuntary childlessness. The measure of infertility is, in both the United States and Canada, failure to conceive over a 12-month period without the use of contraceptives.(4)

According to a 1981 federal study, approximately one in ten Canadian couples is infertile.(5) A 1982 U.S. study concluded that infertility affects an estimated 2.4 million, or 8.5%, of married couples in that country.(6)

The national surveys which have been used to estimate infertility rates in the U.S. may not yield accurate results. There are limitations inherent in the survey design that lead to overestimates and underestimates of the proportion of infertile couples in the population. The time frame of one year used to measure infertility produces an overestimate of the problem, since couples have certainly conceived without medical treatment after one year. In an "unrandomized observational study

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(4) U.S. Congress Office of Technology Assessment, Infertility: Medical and Social Choices, Washington, D.C., U.S. Government Printing Office, 1988, p. 35, and Advisory Committee to the Minister of National Health and Welfare, Storage and Utilization of Human Sperm, Health and Welfare, 1981, p. x (hereinafter Health and Welfare Report).

(5) Health and Welfare Report (1981), p. x. The source of this estimate and its method of calculation are not referenced in the National Health and Welfare study.

(6) U.S. Congress Office of Technology Assessment (1988), p. 3.

of 1,145 infertile couples, ... 35% of those untreated ... became pregnant."(7) Underestimates of infertility are generally a result of how survey questions are phrased and who is excluded from the survey.(8) The U.S. surveys have structured questions in a way that couples who have always used contraceptives or who have never tried to become pregnant are considered to be fertile. A number of infertile couples may be hidden as a result. As well, because the surveys have limited their respondents to married couples, unmarried men and women are not included in the estimates of infertility.

To date, there has been no national study of the general population in Canada to determine the incidence of infertility among individuals and couples of childbearing age.

In Ontario, infertility practitioners have estimated that approximately 15-20% of Ontario couples attempting to conceive are infertile.(9) This estimate is probably low as it is based on couples who attend infertility clinics and there are an unknown number of infertile men and women who may not seek clinic services.

C. What are the Causes of Infertility?

The focus of reproductive medicine and science has been predominantly on the "treatment" of infertility. Critics have charged that the reproductive technologies do not treat or cure but rather circumvent or bypass infertility.(10) As well, the treatment approach has been criticized for its failure to examine in any significant way the causes of infertility in men and women and to develop prevention strategies. Some

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(7) Ibid., p. 52.

(8) Ibid.

(9) Ontario Law Reform Commission, Report on Human Artificial Reproduction and Related Matters, Vol. 1, Ministry of the Attorney General, 1985, p. 10.

(10) Conseil du statut de la femme, "Crumbling Motherhood," Dilemmas, when technology transforms motherhood, Government of Quebec, 1987, p. 4.

known causes of infertility are toxins in the workplace, contraceptives such as the IUD, sexually transmitted diseases and poor nutrition.(11)

In recognition of the contribution of workplace toxins to infertility, some U.S. companies have policies to protect women of childbearing age and the fetus from exposure to hazardous chemicals in the workplace. However, rather than creating a healthy and safe work environment for both male and female employees, these policies have excluded the women of childbearing age from jobs that would expose them to unhealthy substances. J. Bertin's research found that many of the largest firms in the U.S. have adopted policies which deny women access to hundreds of lucrative jobs.(12) These exclusionary policies would appear to be based on, inter alia, the false assumptions that only women contribute to the genetic makeup of children and infertility is experienced only by women.

In addition to unhealthy working conditions, sexually transmitted diseases (STDs), which are most damaging to women's reproductive organs, are a common risk factor for infertility in women. Katherine Young, an associate at the McGill Centre for Medicine, Ethics and Law, is involved in a two-year study on reproductive technology. She states that "sexually transmitted disease ... is the leading cause of infertility in women."(13) It has been estimated that sexually transmitted diseases are

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(11) L.B. Andrews, "Alternative Modes of Reproduction," Reproductive Laws for the 1990s, (eds.) N. Taub and S. Cohen, Rutgers, the State University of New Jersey, 1988, p. 261. N. Pfeffer, "Artificial Insemination, In-vitro Fertilization and the Stigma of Infertility," Reproductive Technologies, (ed.) M. Stanworth, Minneapolis, University of Minnesota Press, 1987, p. 82. CBC Transcripts, "Drawing the Line: Reproductive Technology," Ideas, the Canadian Broadcasting Corporation, Quebec, 17 March 1986, p. 9.

(12) J. Bertin, "Reproductive Hazards in the Workplace," Reproductive Laws for the 1990s (1988), p. 209-214.

(13) K. Dunn, "Reproduction Study Too Narrow: Scholar," Gazette (Montreal), 6 April 1989.

the third most infectious diseases in the U.S. after the common cold and influenza and that they cause 20% of all infertility in the U.S.(14) Yet few efforts by the medical profession and government have been directed toward programs and research on STDs.(15)

The socio-economic position of women has also been identified as having influence on infertility rates, with some commentators pointing out the dearth of options open to working women of childbearing age. The lack of available and affordable child care and paid parental leave, in addition to the low-paying jobs many women occupy, cause them to delay childbearing into years when their fertility has decreased.(16)

As a result, some commentators maintain that studies of infertility should focus on causation and stress the importance of preventive strategies to improve the reproductive health of women. Following from this, a recognized American legal expert on reproductive law has advocated that the study of causes of infertility should be extended to include social and physical factors.(17)

The next section of this paper describes the reproductive techniques and the social, medical, ethical and legal issues they have raised. As well, available information on demand, success and costs of the technologies are presented. Following this is a discussion on regulation of the new reproductive technologies and an overview of the recommendations to regulate reproductive technologies made by selected provincial, federal and international committees which have conducted studies on the subject.

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(14) U.S. Congress Office of Technology Assessment (1988), p. 61.

(15) Ibid., p. 88.

(16) M. Thom, "Dilemmas of the New Birth Technologies," Ms., May 1988, p. 76. Andrews (1988).

(17) Andrews (1988), p. 261.

THE NEW REPRODUCTIVE TECHNOLOGIES

There is a high and increasing demand for infertility services in the United States. According to the U.S. Congress Office of Technology Assessment (OTA), in 1984 there were 1.6 million visits to private physicians for services to assist conception compared to 600,000 in 1968.(18) The OTA also notes that in 1986 an estimated $1 billion was spent on infertility-related services in the U.S. Further, approximately 20,000 couples become parents with the aid of genetic material donated by a third or fourth party each year in the U.S.(19) Comparable national information for Canada does not exist.

An observation made by the OTA is that "although men and women are equally likely to be infertile ... there are relatively few diagnostic and treatment services for men."(20) All of the technologies to assist conception are performed on women.

As already noted, there is a broad range of reproductive technologies to assist conception. Some are neither "new" nor particularly "technologically advanced," despite their label. Included under the rubric of "the new reproductive technologies" are artificial insemination (by husband AIH or by donor AID), in vitro fertilization (IVF), surrogate motherhood, sex selection, egg donation, embryo transfer, and gamete intrafallopian transfer (GIFT). Associated with these technologies are techniques for freezing sperm, eggs and embryos and the potential for experimentation on pre-implanted embryos.

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(18) U.S. Congress Office of Technology Assessment (1988), p. 56.

(19) P. Donovan, "New Reproductive Technologies: Some Legal Dilemmas," Family Planning Perspectives, Vol. 18, No. 2, March/April 1986, p. 57.

(20) U.S. Congress Office of Technology Assessment (1988), p. 139.

A. Artificial Insemination - AID and AIH

Artificial insemination (AI) is a procedure to "treat" (bypass) male infertility or to avoid a genetic abnormality transmitted through the male. It was first practised in North America in 1884. It is the simplest, most successful and widely used alternative reproduction technique.(21) The procedure involves placing either fresh or previously frozen sperm in a woman's reproductive tract at the time she is ovulating. Though the sperm may be from the woman's husband or partner (AIH), in most cases it has been donated by another person, who is unknown to the recipient (AID). Thus, the offspring or AID child is genetically related to the mother and an anonymous donor. Artificial insemination has been the subject of five official reports in Canada, one federal and four provincial.(22)

A study on the use and storage of human sperm was conducted in 1981 by the Department of Health and Welfare. The research identified 18 clinics in health science centres in Canada providing artificial insemination by donor services. Over 1,500 births were reported to have followed AID treatment.(23) The Health and Welfare report was based on 1979 data derived from questionnaires completed by 11 AI centres across Canada. Overall, approximately 90 couples per month sought the infertility services of these centres. On average, when pregnancy occurred, it did so

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(21) Donovan (1986).

(22) See Ontario Law Reform Commission, Report on Human Artificial Reproduction and Related Matters, Vol. 1 and 2, Ministry of the Attorney General, 1985 (hereinafter Ontario Report). Law Reform Commission of Saskatchewan, Tentative Proposals for a Human Artificial Insemination Act, 1981 (hereinafter Saskatchewan Report). Health and Welfare Report (1981). Alberta Institute of Law Research and Reform, Status of Children, Report No. 20, Alberta, 1976. British Columbia Royal Commission on Family and Children's Law, Ninth Report of the Commission on Family and Children's Law: Artificial Insemination, Vancouver, 1975.

(23) Health and Welfare Report (1981), p. x.

after six or seven inseminations. This, combined with the failures, resulted in more than 500 inseminations carried out each month in the clinics. The report mentions a pregnancy rate of 59% but fails to indicate if this success rate is a percentage of the number of women who had received treatment or of the number of inseminations done. The number of sperm donors in each clinic ranged from 7 to 120 and each donor provided about 10 specimens annually. Three of the centres reported freezing donor sperm and storing it in liquid nitrogen before thawing it for insemination.(24)

Clinics in Quebec reported that a donor receives from $25.00 to $50.00 for each specimen he provides. Couples requiring artificial insemination generally pay in total $200.00. Between 1979 and 1984, the Quebec medical insurance plan paid for 34,505 cases of artificial insemination throughout Quebec; the average number of inseminations per woman was eight to ten.(25)

The Ontario Law Reform Commission reported on the findings of its wide-ranging study on reproductive technology in 1985. Ontario Health Insurance Plan (O.H.I.P.) data provided to the Commission revealed that in 1983-84 there were 9,973 artificial insemination procedures carried out in Ontario, compared to 10,360 in 1982-83 and 8,356 in 1981-82. No figures were available on the actual number of women involved and the number of inseminations per woman.(26)

Some writers have questioned whether artificial insemination, which is not a technologically-advanced procedure, should be characterized as a "medical" therapy. The Ontario Law Reform Commission noted that although the artificial insemination procedure need not be carried out only by doctors, there are aspects of it that have medical implications. These include: donor selection and screening; sperm testing and storage; medical and possibly psychological assessment of the recipient; matching of the donor and the recipient's partner to approximate

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(24) Ibid., p. x-xi.

(25) Conseil du statut de la femme (1987), p. 16.

(26) Ontario Report (1985), p. 18.

the characteristics of the social father; treatment of the recipient to regulate ovulation; and determination of the recipient's menstrual cycle.(27)

There are a number of social, ethical and legal concerns associated with AID. One or more of these issues apply to many of the other reproductive technologies because most of them have the following features in common: they are treatments of women; they involve the use of genetic material from a third party; and a fee is paid for the service provided.

Artificial insemination has given rise to the following issues:

Eligibility Criteria Should such characteristics as age, mental capacity, marital status, partner's consent, sexual orientation or economic circumstances enter into decisions on whether to grant or deny potential recipients access to AI treatment?

Screening of Donors Should there be regulations governing the acquisition of donor semen to prevent the transmission of sexually-transmitted or genetic disease to the recipient and her offspring? Are the donor and/or doctor liable if the donor passes on a disease or impairment through his sperm?

Payment to Donors Should sperm donors be paid a fee for their genetic material? Is payment an incentive to hide personal medical information that would exclude an individual from donating his sperm? If payment is acceptable, how much should the donor receive?

Recordkeeping Should records of recipients and of donors be maintained and linked? Are special security measures needed to ensure the anonymity of donors and recipients?

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(27) Ibid., p. 17-18.

Sperm Banks Should sperm be frozen and stored for future use? Should for-profit commercial sperm banks operate and import sperm from other jurisdictions? Should entrepreneurs be allowed to set up banks that sell sperm from men with "superior" characteristics or is this equivalent to attempting to create a "master race"?

Status of AID Child If a child is biologically the offspring of the mother and a donor, what is the legal status of the child? Does the biological father have any rights and responsibilities vis-à-vis his offspring? What are the rights and responsibilities of the social father (the mother's partner or husband)? What are the implications if a woman is artificially inseminated without his consent? Should legislation be enacted to make an AID child the legitimate offspring of the mother and her consenting partner or husband? Should the birth registration name the biological or social father as the child's parent? What are the rights of children to trace their genetic parents?

Safeguards for the Progeny of AID Should a donor be limited in the number of offspring he can produce with his sperm? What are the chances of AID children entering unwittingly into an incestuous relationship? What is the impact on AID children who cannot trace their genetic fathers?

Legislation concerning artificial insemination exists in two jurisdictions in Canada - Quebec and Yukon - and in each it simply addresses the question of the legitimacy of the child conceived by donor insemination. In the province of Quebec, provisions in the Civil Code stipulate that a child conceived by AID is presumed to be the legitimate offspring of the consenting male partner of the woman. The Children's Act of Yukon Territory provides the same presumption, as well as stipulating that the donor is not considered the legal father.(28)

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(28) P. Spallone and D.L. Steinberg, "International Report," Made to Order: The Myth of Reproductive and Genetic Progress, (eds.) P. Spallone and D.L. Steinberg, Pergamon Press, Oxford, 1987, p. 23.

B. *In Vitro* Fertilization - IVF

In vitro fertilization is a therapeutic intervention for female infertility that may be caused by blockages in the fallopian tubes, antibodies to male sperm or a partner who has a low sperm count. It is noteworthy that IVF was initially used for women with blocked tubes, then for women with endometriosis, and now is increasingly being used for reasons unrelated to the woman. The reasons include unexplained joint infertility in couples, poor sperm motility, low sperm count, and poor sperm-mucus interaction. These are reasons not clearly connected to the woman's infertility and highlight the focus of the new reproductive technologies on women's bodies.

IVF involves the union of human gametes (egg and sperm) outside the body in a laboratory setting. The babies born from IVF are referred to as "test-tube" babies because *in vitro* fertilization literally means "fertilization in glass" - in a glass laboratory dish. There is no third-party contribution to the genetic makeup of a resulting child.

IVF is a sophisticated, multi-staged medical procedure. It begins with heavy dosages of fertility drugs administered to the woman, who may not be infertile, to stimulate her ovaries artificially to produce several eggs in one cycle. Mature eggs are then extracted from the woman's ovary through a surgical procedure using a laparoscope. This usually involves a general anesthetic. The collected eggs are then placed in a petri-dish and combined with the male partner's sperm to fertilize the eggs. Next the embryos (fertilized eggs) are returned to the woman's uterus. If the embryos implant in the uterine wall, pregnancy has begun.(29)

In vitro fertilization is one of the most controversial of the birth technologies. A little over a decade ago, its technical feasibility was in question. Since the birth of the first "test tube" baby in 1978, an estimated 4,600 children have been conceived worldwide with the

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(29) Ontario Report (1985), p. 24-25.

aid of this method.(30) The procedure has given rise to a host of concerns.

There is a dearth of research in Canada on demand for, access to, availability, costs and success rates of IVF programs. In fact, the most up-to-date and comprehensive Canadian information on IVF is contained in a series of three articles published by the Globe and Mail in 1988.(31) The discussion that follows, unless otherwise referenced, is derived from the Globe and Mail articles.

At the end of 1987, there were 12 in vitro fertilization clinics operating throughout Canada and three more were scheduled to open in 1988. The first clinic opened in Quebec City in 1979. About 3,500 Canadian women had tried IVF, resulting in 365 babies. At the clinic with the highest success rate, only 13% of couples had had babies.

There is an inverse relationship between the levels of risk and the rates of success associated with IVF programs. That is, the evidence indicates that risks to both women and resulting babies are high, while the chances of becoming pregnant and carrying a healthy fetus to term are low. The IVF procedure is both physically and emotionally stressful on the women who undergo it, often more than once. It involves hormonal treatment, surgery, general anesthetic, repeated ultrasound tests and blood drawing.(32) As well, the drug given to women to stimulate their ovaries

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(30) L. Walters, "Ethics and New Reproduction Technologies: An International Review of Committee Statements," Hastings Centre Report, (Special Supplement), June 1987, p. 3.

(31) A. Pappert, "In vitro program has risks and pregnancy rate is low," Globe and Mail (Toronto), 6 February 1988; "Success rates not what they seem," Globe and Mail (Toronto), 8 February 1988; "New technology poses ethical dilemma," Globe and Mail (Toronto), 9 February 1988.

(32) L. Williams, "But What Will they Mean for Women?" Feminist Concerns about the New Reproductive Technologies," Feminist Perspectives, No. 6, Canadian Research Institute for the Advancement of Women, Ottawa, 1986, p. 13.

to produce more eggs has been compared to DES,(33) a drug given to women in the 1940s and 1950s to prevent miscarriages but which was later found to cause cervical cancer in both the women and their female offspring. The IVF hormone therapy has been related to cancer and to the development of ovarian cysts. Further, because clinics transfer up to three or four embryos at a time to improve the chance of a pregnancy, multiple births occur frequently in IVF procedures, with correspondingly greater risks to both the mother and the fetuses.

Threats to the life and health of children born from in vitro fertilization have also been documented. A survey by the Australian government in 1985 that examined 900 IVF pregnancies and found that babies conceived by this method were four times as likely as non-IVF babies to be stillborn and to have increased rates of abnormalities. As well, congenital birth defects were almost double in IVF babies.

The financial costs of IVF are high. The Ontario Health Insurance Plan (OHIP) is the only provincial health insurance plan in Canada to cover them in hospital-based clinics. (In fact, Ontario is one of the few jurisdictions in the world to do so.) It has been estimated that the Ontario government spent more than $7 million in two years on four clinics. During that time, approximately 200 babies were born for an average cost of $35,000.00 per baby. In private clinics in Ontario, although OHIP pays for some laboratory work, patients pay up to $2,500.00 for each IVF attempt. In other provinces, patients pay up to $5,200.00 for each attempt.

The low success rate of IVF - ranging from 5% to 15% worldwide - has fuelled criticisms that the procedure is human experimentation on women's bodies, rather than treatment.(34) It was concluded at an

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(33) M. Eichler, "Reflections on Motherhood, Apple Pie, the New Reproductive Technologies and the Role of Sociologists in Society," Society, Newsletter of the Canadian Sociology and Anthropology Association, Vol. 13, No. 1, February 1989, p. 2.

(34) Williams (1986), p. 14.

International Summit Conference on Bioethics held in Toronto in 1987 that "because of its low success rate, in vitro fertilization should continue to be regarded as experimental."

Many infertile people turn to assisted conception therapies after years of attempting to reproduce. Their strong, and in some cases highly emotionally-charged, desire to have a child makes them potentially vulnerable to exploitation. Some of the evidence suggests that infertility practitioners and agencies have not been completely open about the odds of achieving a pregnancy and carrying a fetus to term. In other words, data on success rates are suspect. Some clinics that report high success rates have tended to derive them from very small sample sizes. Also, some clinics screen out women who are unlikely to conceive, such as older women or women with particular infertility problems. Like those in other jurisdictions, the Canadian clinics that agreed to give success rates based them on pregnancies rather than on births, so that they included ectopic (tubal) pregnancies and miscarriages. It has been estimated that about 5% of IVF pregnancies are ectopic and that in some clinics miscarriage rates are between 50% and 60%. Some commentators have expressed the fear that infertile women seeking to have children are deliberately kept ignorant about the health risks and low rates of success associated with IVF treatment. Indeed, a survey of IVF clinics in the U.S. found that deliberate misinformation was the norm. The director of an IVF clinic stated that he believes "citing a general success rate to women is common, with patients not being told everything about the record of the actual clinic in question." He went on to admit "if patients were told ... it's hard to believe that any sane-minded patient would go there to subject herself to such expensive procedures. So the fact that they are going through indicates that something is not being told."(35)

IVF has given rise to embryo freezing techniques or cryopreservation, whereby because of the risk of multiple pregnancies, a

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(35) G. Corea and S. Ince, "Report of a Survey of IVF Clinics in the U.S.," Made to Order: The Myth of Reproductive and Genetic Progress (1987), p. 139.

limited number of embryos are implanted in the wombs of women undergoing the procedure. "Spare" embryos are frozen to be used later if the procedure fails or if the couple decides to try to have more children in the future. Only about 1 in 10 frozen embryos survives to create a successful pregnancy. There have been approximately 100 babies born worldwide from frozen embryos. Given the low success rates, the technique is still considered experimental.(36)

Embryo freezing has raised a number of questions concerning the status of the embryo that has not been implanted. For example, who has lawful use over the embryos if the couple dies or divorces or decides not to try IVF again? Can they be owned? Can they be destroyed? Can frozen embryos be subjected to experimentation? What are the criteria for deciding which embryo will not be implanted? Who decides how many embryos are implanted? What are the health risks to babies born from frozen embryos? For how long should the embryo be stored?

Another issue raised by the IVF procedure is "selective reduction" of fetuses. To reduce the medical dangers associated with multiple pregnancies, doctors have begun to abort fetuses in women who cannot or who choose not to continue with a multiple pregnancy.(37) This practice has raised ethical concerns for women.

In vitro fertilization and the associated practices of embryo freezing and selective reduction are carried out in Canada without any legislative guidelines or principles. According to the director of the University of Manitoba's Centre for Professional and Applied Ethics, "a woman has the right to control the number of fetuses she wants to carry in a multiple pregnancy ... but these IVF practices are operating in a legal vacuum that must be addressed."(38)

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(36) U.S. Congress Office of Technology Assessment (1988), p. 299.

(37) D. Lipovenko, "Infertility Technology Forces People to Make Life and Death Choices," *Globe and Mail* (Toronto), 21 January 1989.

(38) *Ibid*.

In this "legal vacuum," hospitals have adopted their own norms. The Toronto East General Hospital and the Toronto General Hospital freeze spare embryos. At the former, couples have donated their frozen embryos to other infertile couples, thereby helping to resolve the problem of surplus embryos. Also at the Toronto East General, no more than three or four embryos will be frozen per couple. Should the couple die, the hospital claims ownership of the embryos. However, if the couple separates, there is still uncertainty about ownership.(39) The Toronto General has adopted a policy of not storing frozen embryos beyond two years. The unused embryos are then destroyed or donated for research.

C. Embryo Transfer

Embryo transfer is a non-surgical procedure that was initially developed for use in cattle breeding. As a human reproductive technology, it is used to assist an infertile woman who has a normal uterus but is incapable of conceiving because of tubal obstruction or because she has no ovaries. What distinguishes the procedure from IVF is the use of a fertile woman's eggs by an infertile woman.

Embryos may be transferred in three different ways:

1) An infertile woman's partner artificially inseminates a fertile donor. Once the fertile woman conceives, the interior of her uterus is washed out to recover the fertilized embryo in a process termed "lavage." The embryo is then non-surgically implanted into the uterus of the infertile woman.

2) An infertile woman receives a donated embryo for implantation from a couple who have a "spare" embryo(s) after an IVF treatment.

3) An infertile woman's partner fertilizes donated eggs in vitro. The embryo is then implanted into the infertile woman's womb.

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(39) D. Lipovenko, "Freezing of human embryos raises legal, ethical questions," Globe and Mail (Toronto), 20 January 1989.

Thus, the embryo transferred to an infertile woman can be the product of fertilization that occurs in vivo, that is within the body of the donor using the sperm of the infertile woman's partner, and requires lavage; fertilization that occurs in vitro using the gametes (ovum and sperm) of a donor couple; and fertilization that occurs in vitro using the egg of a fertile donor woman and the sperm of the infertile woman's partner.

Embryo transfer involves third party donation, and, in the case of embryo donation, fourth party donation, of genetic material. The procedure allows the embryo recipient to have a biological and social relationship with the child even though she is not the genetic mother of the child. As well, the infertile woman's partner is genetically related to the child if his gametes were used for conception.(40)

Many of the medical, social, and legal issues raised by artificial insemination by a donor and by in vitro fertilization are applicable to embryo transfer. In addition, embryo transfer involving lavage raises specific medical concerns. It is still considered to be experimental - few viable pregnancies have resulted from the procedure - and the health risks to the fertile donor are serious. If the lavage fails, the donor woman risks ectopic and multiple pregnancy. Further, the procedure can result in the transmission of disease or infection to the uterus of the donor. In light of these risks, the "future of this technique is uncertain," according to the U.S. Congress Office of Technology Assessment.(41)

D. Gamete Intrafallopian Transfer ("GIFT")

This reproductive technology involves removal of ova from a woman who has at least one normal fallopian tube. The sperm from her partner or a donor and the unfertilized ova are then placed in the woman's normal fallopian tube for fertilization and subsequent development. The

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(40) Vanier Institute of the Family, p. 11.

(41) U.S. Congress Office of Technology Assessment (1988), p. 298.

GIFT procedure, which was first described in 1984, will be used increasingly, the OTA says, as an option for, among others, cases of persistent unexplained infertility.(42) The literature reviewed for this paper did not identify any clinics using the gamete intrafallopian transfer technology in Canada. In fact, the various reports reviewed in the next section of this paper did not address the GIFT technique at all.

E. Surrogate Motherhood

Of all the techniques of assisted reproduction, surrogate motherhood arrangements have aroused the harshest public criticism. Essentially, surrogate motherhood involves a woman's artificial insemination with the sperm of a man whose wife or partner is infertile. (A surrogate may undergo a technique to assist conception other than AI although according to the literature this rarely occurs.) The surrogate generally signs a pre-conception contract that she will gestate and give birth to the man's child and turn it over to the couple after birth. Such an arrangement produces a child who is genetically related to the surrogate and to the husband of the infertile woman. There is almost always a fee paid to the surrogate.(43)

The label "surrogate motherhood" has been called a misnomer. One critic has argued that "surrogate motherhood is a completely inaccurate term. ... Any woman who labours to give birth with her own ova and from her own womb is a real mother."(44) As well, it has been observed that surrogate motherhood, which comes under the rubric of "new reproductive technologies," entails artificial insemination, which is not new, and a pre-conception contract for the production of a child, which is

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(42) Ibid., p. 61.

(43) Conseil du statut de la femme (1987), p. 20.

(44) Williams (1986), p. 19.

not a technology.(45) In this regard, the procedure might perhaps more accurately be termed a new reproductive agreement or arrangement.

In addition to the issues also raised by AID, surrogacy suggests its own unique set of concerns. The typical woman contracting to conceive and take the fetus to term for a couple is most probably in a blue-collar job or a housewife, while the contracting couple tend to be professionals.(46) Thus, surrogacy contracts are generally not contracts among equals.

For some, the commercial aspect of surrogate motherhood is the most controversial issue raised by this form of maternity.(47) It is seen as tantamount to baby-selling. By law, a human being cannot be the object of commerce, but some women who enter into surrogate mother contracts receive $10,000.00 plus medical expenses in compensation.(48) This raises the question, what is the payment for - the product delivered, the risks taken, or the inconvenience assumed?(49)

Some critics have argued that surrogacy arrangements transform women into reproductive resources and the children they bear into commodities or products.(50)

Legal questions have arisen over the enforceability of pre-conception contracts. Can a surrogate mother's life-style be controlled during her pregnancy? Can she be required to undergo pre-natal diagnostic tests? What if she decides to keep the child at birth? What if the contracting couple refuses to honour the contract? Does the state have

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(45) Eichler (1989), p. 1.

(46) D. Lipovenko, "Study Undertaken For Law Reform Body Turns Up 118 Surrogate-Mother Cases," Globe and Mail (Toronto), 10 February 1989.

(47) Conseil du statut de la femme (1987), p. 21.

(48) Lipovenko (10 February 1989).

(49) Vanier Institute of the Family, p. 15.

(50) Ibid.

an interest in regulating the terms of such contracts between "consenting" adults?

In early 1989, an unpublished report prepared for the Law Reform Commission of Canada documented that there are at least 118 cases of surrogacy contracts for the production of babies involving Canadians.(51) The report notes that the cases involve Canadian couples who have entered into surrogate mother contracts with U.S. women via U.S. surrogacy agencies or who have hired a Canadian surrogate. The authors of the report believe that the figure underestimates the practice in Canada, as the activity is in large part underground. In the United States, it was estimated that approximately 600 babies had been born through surrogate arrangements by the beginning of 1988.(52) Despite the controversy surrounding this arrangement to assist the infertile, few actual cases have been recorded.

F. Sex Selection

For-profit, franchised sex selection clinics now operate in Canadian cities.(53) The technique for pre-selecting the sex of offspring was developed by a U.S. doctor who has sold 65 franchises around the world since 1973. A child's sex is determined by the male's sperm: X-chromosome sperm produces a girl and Y-chromosome sperm produces a boy. Sex selection involves separating X-chromosome sperm from Y-chromosome sperm and artificially inseminating the mother, who is being treated with fertility drugs, with concentrated X or Y sperm depending on the desired sex of the child. Approximately 700 babies have been born through the technique, and the success rate has ranged from 80% to 85% in pre-selecting males and 70% in pre-selecting females. As of 1988, a Toronto clinic was operating, an Edmonton clinic was to open that year, and five other Canadian cities were being considered as sites for a clinic. The Toronto clinic charges $600.00

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(51) Lipovenko (10 February 1989).

(52) U.S. Congress Office of Technology Assessment (1988), p. 267.

(53) C. Cornacchia, "New franchises Offer You a Designer Baby," Gazette (Montreal), 12 March 1988.

for each sperm separation and artificial insemination, and an average of three tries is necessary to achieve pregnancy.

Sex selection clinics attempt to pre-determine sex at the point of conception. Sex selection can also be practised after conception has occurred. By using the technique, chorionic biopsy, a woman can know the genetic health and sex of her fetus in the early stages of pregnancy - around 10 weeks. Chorionic biopsy was developed for use by women over 35 years of age with a relatively high risk of having a child with a genetic disorder. The procedure, however, is also being used simply to control the sex of offspring. If the fetus is not the wanted sex, it is aborted. Because of the ethical issues this practice raises, some western countries have passed legislation prohibiting the release of data on the sex of the fetus following the chorionic biopsy procedure.(54)

The ability to pre-select the sex of offspring has raised concerns about the implications of the reproduction of "designer babies." Sociological studies have shown that the cultural norms of many societies prefer males as first-born. Abortion following prenatal sex identification tests and female infanticide are employed to maintain this cultural preference. It has been documented that sex selection techniques may severely disrupt the sex ratio balance. For example, in India, the systematic abortion of female fetuses has affected the demographic balance of the country. In 1901, there were 9 million more men than women, and by 1981 there were 22 million more men than women.(55)

As previously noted, with the exception of Quebec and Yukon, which have minimal regulatory controls, there are no laws or uniform standards governing the administration of infertility services in Canada. Essentially, access, availability, donor screening, consumer eligibility, payment, costs, the range of assisted conception techniques offered,

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(54) Ibid.

(55) R. Rowland, "Of Women Born, but for How Long? The Relationship of Women to the New Reproductive Technologies and the Issue of Choice," Made to Order: The Myth of Reproductive and Genetic Progress (1987), p. 76.

experimentation and so forth are controlled, in the main, by doctors, hospitals and clinic committees. Thus, administrative rules and regulations are generally determined at the local level by medical professionals. As well, there is a dearth of comprehensive or systematic information on the agencies and institutions that provide reproductive technology services in this country.

The call by women's groups for a royal commission on reproductive technology is in large part a response to the lack of information and national standards guiding developments and practices in reproductive medicine. The groups maintain that these practices have social, ethical and legal implications for women, and more generally for society, yet they have advanced independently of a socio-legal framework to guide or inform them.(56)

REGULATION OF REPRODUCTIVE TECHNOLOGY: RECENT RECOMMENDATIONS

This section of the paper will focus on the relevant issues that have been reviewed by government-sponsored commissions and committees established in the 1980s and would no doubt be examined by a royal commission set up to study reproductive technology in Canada.

The pivotal question addressed by the inquiries was what type of controls should be imposed on suppliers (medical profession, facilities and donors) and recipients (infertile women and couples) of the reproductive technologies. The options include government regulation that would involve civil and criminal legislation: self-regulation by reproductive health professionals who would incorporate the new technology into medical association codes of ethics and governing acts; or the regulation of the free market where consumer demand in part would govern the range of available techniques to assist conception. With few exceptions, laissez-faire market forces and self-governing medical

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(56) Eichler (1989).

professionals have propelled reproductive technology developments in Canada.(57)

It is noteworthy that the interest and involvement of law reformers and legislators in reproductive medicine is a relatively new phenomenon. B. Knoppers, a Canadian lawyer who has written extensively on reproductive technology, makes the point that while the search for means to alleviate infertility extends back to the Bible, it is only since the development of scientific techniques to assist conception - such as in vitro fertilization and the freezing and storing of human ova, sperm and embryos - that assisted conception has captured the interest of lawmakers. Accordingly, she notes, the legislative debate over reproductive technology has not focused on "the therapeutic indications of reproductive technology as pertaining to the individual needs of the infertile ... [but] on the challenge their utilization poses for lawmakers in terms of determining the scope of rights and freedoms provided under our laws."(58)

It is within the context of the competing rights and freedoms of the "potential human life" of embryos and of the "bodily self-determination" of the infertile that the law-reformers and lawmakers have institutionalized reproductive technology. As Knoppers points out, there is a virtual consensus among most countries on a regulatory approach to reproductive technology "fostering donor autonomy and control over his or her gametes and yet protecting the human embryo from undue exploitation and experimentation."(59)

The concern of reformers to protect the potential life of human gametes or embryos, yet also to respect the autonomous decisionmaking

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(57) T. McCormack, "Public Policies and Reproductive Technology: A Feminist Critique," Canadian Public Policy, Vol. XIV, No. 4, 1988, p. 366.

(58) B. Knoppers and E. Sloss, "Recent Developments: Legislative Reforms in Reproductive Technology," Ottawa Law Review, Vol. 18, No. 3, 1988, p. 666.

(59) B. Knoppers, "Reproductive Technology and International Mechanisms of Protection of the Human Person," McGill Law Journal, Vol. 32, 1987, p. 340.

of individual participants to reproductive choice is analogous, to a degree, with issues raised in the abortion debate.

In Morgentaler et al. v. The Queen (1988), the Supreme Court declared that s. 251 of the Criminal Code of Canada (the abortion law) contravened s. 7 of the Canadian Charter of Rights and Freedoms and was, therefore, unconstitutional. In her reasons for judgment, Madam Justice Wilson said that the state's interest in protecting the fetus becomes "compelling" in the later stages of pregnancy.(60) Similarly, protection of the embryo, in the form of prohibitions on handling, research and experimentation for certain purposes and beyond a certain stage of development, are typical recommendations in the international reports on reproductive technology. These restrictions are to protect potential life.

From her in-depth review of the reports, Knoppers concludes the following:

> No report has recognized the legal status of personhood in either the in vitro [embryos] or the in utero foetus prior to live birth. While none would leave such human genetic material without any protection, all reports seek to distinguish it from the general rules governing human tissue or organ transplants, experimentation, and from the donation of hair, blood and other regenerable body parts. This is achieved by treating the embryo as a "potential human person" or as human life worthy of protection.(61)

The U.S. Congress Office of Technology Assessment has identified some 40 countries that have issued reports by governmental or non-governmental bodies on the ethical and legal aspects of reproductive technologies. As well, the issues raised by the new technologies have been considered by four international organizations.(62)

Within the scope of a single paper, it is not possible to report on the findings of 44 separate studies. This paper will report the

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(60) Supreme Court of Canada, Morgentaler et al. v. The Queen, File No. 19556, 28 January 1988.

(61) Knoppers (1986), p. 698.

(62) U.S. Congress Office of Technology Assessment (1988), p. 329.

recommendations made by Canadian and United Kingdom committees of inquiry, and options developed for congressional action in the United States, and the principles adopted by the Council of Europe member states.

Canadian reports reviewed include: Health and Welfare Canada, Report of the Advisory Committee on the Storage and Utilization of Human Sperm (1981); the Saskatchewan Law Reform Commission, Tentative Proposals for a Human Artificial Insemination Act (1981); and the Ontario Law Reform Commission, Report on Human Artificial Reproduction and Related Matters (1985). Also reported are the guidelines on embryo research developed by the Medical Research Council of Canada, Guidelines on Research Involving Human Subjects (1987) and the recommendations of the Canadian Law Reform Commission, Crimes Against the Foetus (1989).

The recommendations of the Warnock Committee in the United Kingdom reported in Department of Health and Social Security, Report of the Committee of Inquiry into Human Fertilization and Embryology (1984), are also reviewed. It is noteworthy that the Ontario Law Reform Commission and Warnock Committee reports on the new reproductive technologies are considered to be the most comprehensive reviews of the subject.

The proposed principles of the Council of Europe, Ad Hoc Committee of Experts on Progress in the Biomedical Sciences, Provisional Principles on the Techniques of Human Artificial Procreation and Certain Procedures Carried Out on Embryos in Connection with Those Techniques (1986), summarized in the Office of Technology Assessment report, are included.

Finally, the policy issues and options for U.S. congressional action identified in U.S. Congress Office of Technology Assessment, Infertility: Medical and Social Choices (1988), are presented.

The reproductive issues reviewed below are those raised and discussed with the most frequency in the literature.

A. Freezing and Commercial Use of Human Sperm, Ova and Embryos

The aim of freezing human genetic material is to ensure its preservation for future use by the donor or donors, by infertile women or

couples, and for research and experimentation. The issues this practice has raised include whether storage should be permitted at all and, if so, for how long; should the stored gametes and embryos be treated as a commodity to be bought and sold by commercial gamete banks; should the import of gametes from commercial banks in other countries be allowed?

Each of the committees that addressed the storage or freezing of human gametes and the commercial use of sperm, ova and embryos recommends that such activities be allowed to take place, subject to government regulation.

The federal Health and Welfare study focused only on artificial insemination. It highlights the need for federally-regulated quality control of the conditions and techniques of acquiring, storing and distributing sperm. The Committee states:

> Until regulations establishing federal standards of quality are in effect for Canada, the importation of sperm from commercial human sperm banks should be prohibited; and no new human sperm banks should be allowed to operate outside the jurisdiction of a university or other publicly-owned agency.(63)

The Ontario report recommends that commercial gamete banks that buy and sell sperm, ova and embryos be allowed to operate in the province subject to "license and under stringent regulations setting standards of operation." It further recommends that the use of gametes and embryos imported from outside the province be permitted in conformity with "uniform standards" developed by the federal and provincial governments. Licensed banks would be prohibited from providing gametes or embryos to anyone other than a licensed medical doctor or reproductive health care agency.(64)

Similarly, the Warnock Committee report recommends licensing of reproductive services and techniques, including "banks for the storage of frozen human eggs, semen and embryos" by a "statutory licensing authority." The Committee recommends that, under license, the "sale or

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(63) Health and Welfare Report (1981), recommendation 2.5.

(64) Ontario Report (1985), recommendations 17.(1),(2),(3); 18.(1),(2).

purchase of human gametes or embryos should be permitted" and, therefore, "unauthorized sale or purchase should be made a criminal offence."(65)

B. Eligibility Criteria for Participation

The criteria employed by physicians, clinics and hospitals when selecting participants for infertility treatments include, in addition to medical indications of infertility and genetic disorders, social factors such as age, marital status, spousal consent and sexual orientation. The Ontario Law Reform Commission regards this determination of eligibility as "one of the most controversial issues respecting the new reproductive technologies ... specifically, the question of marital status."(66)

Should only married couples be eligible, considering that the norm is no longer the two-parent family? Should lesbian women be excluded from conceiving through artificial insemination because of their sexual orientation? The evidence suggests that a homosexual orientation need not necessarily preclude parenting. In at least five U.S. cities, a "baby boom" has occurred in gay communities where lesbian women are conceiving through the use of artificial insemination.(67) Part of the concern is with "unsuitable" persons using the reproductive technologies to become parents. Of course, as both the Ontario Law Reform Commission and the Warnock Committee point out, fertile individuals and couples have the right to reproduce irrespective of their perceived suitability for parenthood.

None of the reports recommend denying unmarried couples access to reproductive services. The U.K. and Saskatchewan report do not advocate legislation or other regulatory schemes to govern the

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(65) Department of Health and Social Security, Report of the Committee of Inquiry into Human Fertilization and Embryology, 1984, paragraph 13.13 (hereinafter Warnock Report).

(66) Ontario Report (1985), p. 53.

(67) E. Uzelac, "Major Gay Communities Experience Baby Boom," Ottawa Citizen, 21 March 1989.

determination of eligibility for infertility treatment. The Ontario Law Reform Commission, however, recommends a different approach in which regulations would be set by the provincial medical association.

The Saskatchewan Law Reform Commission, which dealt specifically with artificial insemination, would leave determinations of eligibility to the treating physician. The Commission notes that there is no medical reason to restrict the procedure to married couples and that The Saskatchewan Human Rights Code prohibits discrimination on the basis of marital status with respect to services that are offered to the public. It also notes that reference to marital status or economic status as a ground for refusal to inseminate a woman varied from one physician to another and reflected individual physician disposition, not medical policy. Finally, the Commission does not countenance legislative regulation to control access to artificial insemination treatment based on social and economic criteria, including the consent of the woman's husband or partner. This is because of the belief that statutory prohibitions can be easily circumvented and that "the decision as to whether or not to become pregnant is not one in which the law should play a role."(68) In light of the positions taken by the Committee, the report recommends that "the social and economic criteria to be used in selecting women for artificial insemination should not be set by legislation, except to the extent that The Saskatchewan Human Rights Code now prohibits discrimination."(69)

The Ontario Law Reform Commission recommends that the provincial medical association establish eligibility regulations in the Health Disciplines Act to guide the decisionmaking of the province's doctors. The report notes that a variety of factors or variables need to be taken into consideration in determining eligibility. They included the "home environment, the physical and mental health of the prospective parent or parents, their emotional reaction to artificial conception and its real and potential frustrations, the marital status of the parties and, where

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(68) Saskatchewan Report (1981), p. 1-4.

(69) Ibid., recommendation 1.(1).

married in a de facto relationship, the stability of the union."(70) The Commission states that assessments of a couple's psychosocial stability should not be left to individual physicians(71) and that "eligibility to participate in an artificial conception programme should be limited to stable single women and to stable men and stable women in stable marital or non-marital unions."(72)

The Warnock Committee, like the Saskatchewan Law Reform Commission, would leave considerations concerning eligibility to individual medical practitioners. It does state, however, that it takes the term couple "to mean a heterosexual couple living together in a stable relationship, whether married or not."(73) The Committee notes that although it "will place a heavy burden of responsibility on the individual consultant who must make social judgments that go beyond the purely medical," it was not possible to establish "comprehensive criteria that would be sensitive to the circumstances of every case."(74) The recommendation that emerged from the Committee's consideration of eligibility is that "in cases where consultants decline to provide treatment, they should always give the patient a full explanation of the reasons."(75)

The Council of Europe is alone in specifically stating that only heterosexual couples should be eligible for reproductive services. The Council's proposed principles state that "the availability of artificial procreation techniques should be limited to heterosexual couples with a medical need."(76)

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(70) Ontario Report (1985), p. 158.

(71) Ibid., p. 158-159.

(72) Ibid., recommendations 5, 6.

(73) Warnock Report (1984), paragraph 2.6.

(74) Ibid., paragraph 2.13.

(75) Ibid.

(76) U.S. Congress Office of Technology Assessment (1988), p. 356.

C. Screening of Donors

As with any donated biological product, standards or regulations governing the quality control of donated human genetic material are regarded as essential by all those who have considered donor screening. In Canada, the Ontario report is alone in recommending that rules governing donor screening not be legislated but rather be subject to regulations set by the medical profession.

The Health and Welfare report recommends federal legislation related to the screening of donated sperm to ensure that the "semen is not infectious, that the donor does not have a transmissible disease, that the specimen has been collected properly, and that storage conditions will not impair the quality of the specimen." The report recommends that, at the minimum, all prospective donors complete a "detailed genetic inquiry."(77)

The Saskatchewan report recommends a legislative scheme involving donors and recipients that "should prescribe minimum investigation and screening requirements for the selection of donors" and "determine whether or not there are any factors peculiar to prospective recipients which make impregnation a danger to their health."(78)

As with the selection of participants, the Ontario Law Reform Commission recommends that professional regulations, not government legislation, govern how and who is selected to be a gamete donor. The report states that "legislation should remain silent on criteria for the selection of gamete donors. Questions of reproductive history, marital status, and genetic and other medical status should be left to professional standards to be set by the medical profession."(79)

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(77) Health and Welfare Report (1981), recommendations 2.1, 2.2.

(78) Saskatchewan Report (1981), recommendation 1.4.

(79) Ontario Report (1985), recommendation 8.

The Council of Europe report recommends that both physicians and clinics be required to screen donors for infectious and genetic disease.(80)

D. Payment to Donor

The Ontario Law Reform Commission notes that the provincial Human Tissue Gift Act proscribes the commodification or commercialization of human tissue or body parts.(81) Yet donors of sperm receive payment for the product they supply, as do women who donate their eggs. The practice has been justified as remuneration for donor time, inconvenience or expenses rather than payment for the commodity per se. In addition to raising concerns related to the moral or ethical implications of buying and selling human gametes, critics regard payment as possible encouragement to a prospective donor to keep hidden any medical history that might preclude him or her from being accepted as a donor. Both the Ontario Law Reform Commission and the Warnock Committee countenance payment to donors for their "expenses."

The Warnock report recommends that "there should be a gradual move towards a system where semen donors should be given only their expenses."(82) Remuneration for the donation of ova is covered in a separate recommendation in the report, which states that "egg donation be ... subject to the same type of licensing and controls as ... recommended for the regulation of AID..."(83)

The Ontario Law Reform Commission also views payment to donors of sperm for their reasonable expenses as an acceptable practice. It identifies expenses as including "the time and inconvenience involved in the initial screening with a view to recruitment into donor programmes, and the periodic follow-up checking while active donors." Payment for

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(80) U.S. Congress Office of Technology Assessment (1988), p. 356.

(81) Ontario Report (1985), p. 167.

(82) Warnock Report (1984), paragraph 4.27.

(83) Ibid., paragraph 6.6.

"discomfort" is not a billable item. The acceptable amount of remuneration is also specified by the Commission for sperm donors. Egg donors would be entitled to a greater, unspecified sum, owing to the more invasive procedures involved. With regard to sperm donation payments, the Commission recommends that "the sum should not be so great as to be an incentive to deceive, nor so great as to unduly burden a clinic having to pay for the time of applicants it rejects. In Ontario, existing payments tend to fall within the $25-$50 range, which is regarded as acceptable. The same principles ... should be applied to ovum donors, although payments may prove to be greater where ovum recovery involves invasive procedures, such as laparoscopy, or where a woman's naturally-released ovum is recovered non-surgically by means of in vivo fertilization and lavage."(84)

The Council of Europe recommends that neither donors nor banks should receive any profit.(85)

E. Frequency of Use of a Donor's Sperm and Ova

The technology for freezing both sperm and ova for future use has made it possible that a host of children could be genetically linked to one donor. This raises social and medical concerns. One is the problem of half-siblings unwittingly entering into incestuous relationships. Another is the possibility that offspring may in later life develop genetic disorders linked to an individual donor. The responses of the committees considering this issue have been to recommend restrictions on the number of times a donor could donate his or her gametes.

The Ontario Law Reform Commission does not view legislation as an appropriate means for controlling the frequency of use of individual gamete donors. They advocate that such control "should be left to the

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(84) Ontario Report (1985), recommendation 15.(1).

(85) U.S. Congress Office of Technology Assessment (1988), p. 356.

professional judgment and ethics of medical practitioners and to the preference of participants in artificial conception programmes."(86)

The Council of Europe simply states that the number of children born from the gametes of any one donor should be limited.(87)

The Warnock Committee proposes a limit of 10 children who can be fathered by one donor. The same limit would presumably apply to egg donors.(88) One obvious problem with attempting to limit the number of times a donor's gametes are used is establishing linkages with all clinics that take donations. The U.K. report recommends that the National Health Service numbers of all donors should be checked by clinics against a "centrally maintained list of NHS numbers of existing donors, which is held separately from the NHS central register."(89)

The Health and Welfare committee recommends that federal regulation should govern the procedures involved in donor selection to "ensure that a limit to the number of pregnancies from any one donor may be set."(90)

F. Relationship of Offspring to Donor and Recipients

All committees or commissions have addressed the issue of parental rights and responsibilities over the offspring conceived with a donor's gametes. Where third-party genetic material is donated, as in AID, egg donation and embryo transfer, the question of the legal and social relationship of the genetic parent (the donor) and the social parent(s) to the offspring is raised. The relationship issue has also prompted concerns about the legality of putting the non-genetic, social parent's name on the birth record and the renunciation of parentage by the donor.

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(86) Ontario Report (1985), recommendation 16.

(87) U.S. Congress Office of Technology Assessment (1988), p. 356.

(88) Warnock Report (1984), paragraph 4.26.

(89) Ibid.

(90) Health and Welfare Report (1981), recommendation 2.4.

The Warnock Committee recommends legislative change to render the AID child legitimate, provided that both the child's mother and her husband had given their consent to infertility treatment.(91) It recommends further legislation to exclude the semen donor from any parental rights and duties in relation to the child.(92) It also recommends that the law allow the social father of an AID child to be registered as the father.(93) Legal provisions are also recommended to ensure that the mother of a child born following egg donation be regarded in law as the mother of that child and that the egg donor would have no rights or obligations in relation to the child.(94) Finally, a child born following embryo donation would be regarded in law as the child of the biological mother and the social father and the embryo donors would have no rights or obligations in respect of the child.

The Council of Europe provisions would make the woman who gives birth to the child the legal mother and her husband or partner the legal father, provided he gave his consent. Further, the donor would have no responsibilities or rights to the child.(95)

The Health and Welfare committee recommends that provincial legislation be drafted "to ensure a child born by AID is recognized as a legitimate child of the mother and her consenting husband." And, if the mother's husband has consented to the AID procedure, amendments should be made to provincial statutes to register him as the father.(96)

The Saskatchewan Law Reform Commission recommends that a child born following AID be regarded in law as a child of the husband if he

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(91) Warnock Report (1984), paragraph 4.17.

(92) Ibid., paragraph 4.22.

(93) Ibid., paragraph 4.25.

(94) Ibid., paragraph 6.8.

(95) U.S. Congress Office of Technology Assessment (1988), p. 356.

(96) Health and Welfare Report (1981), recommendations 1, 1.3.

had given his prior consent.(97) Further, the Committee recommended that the donor not be considered the parent of a child conceived with his semen.(98)

The Ontario Law Reform Commission recommends that if a woman's husband or male partner has consented to the artificial conception procedure or procedures, he should be "conclusively" regarded as the child's legal father.(99) Further, a donor of sperm or ovum should have no parental rights or duties regarding the child conceived with his or her gametes.(100) And "the mother's spouse or partner ... should be registered as the child's father."(101)

G. Anonymity of Recipients and Donors

Some form of recordkeeping on both donors and recipients in reproductive technology treatments is seen as necessary to keep track of the number of times a donor is used and to be able to link donor and recipient should a genetic disease be later detected in artificial conception children. Maintenance and access to records that contain information on the identity of participants could have personal and legal implications for donors, recipients and offspring. It is assumed that if donors are not assured of anonymity, it would reduce the number willing to donate their gametes to clinics.

The Warnock Committee recommends anonymity between the donor and the recipient(s) involved in infertility treatment "as a matter of good practice."(102) They further recommend that a child conceived with donor

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(97) Saskatchewan Report (1981), recommendation 3.1.

(98) Ibid., recommendation 3.4.

(99) Ontario Report (1985), recommendation 19.(1).

(100) Ibid., recommendation 19.(2).

(101) Ibid., recommendation 20.(a).

(102) Warnock Report (1984), paragraph 3.2.

gametes, on reaching the age of 18 "should have access to the basic information about the donor's ethnic origin and genetic health."(103) The Committee proposed legislation be enacted to provide the right of access to this information.

The Ontario Law Reform Commission would leave decisions about granting access to medical records to medical professionals. They recommended that anonymity of all parties (donor, recipient and child) "should be preserved in the medical records"(104) and that "access to medical records by the parties involved ... should be left to individual members of the medical profession." The Commission adds the proviso that only medical information may be released and that no one may disclose information that would identify the donor and the recipient.(105) They note that sanction for failure to abide by the anonymity regulations would lie in civil liability in negligence and in medical profession misconduct regulations.

The Saskatchewan report identifies the semen donor, the recipient and the AID child as "protected persons" and it recommended that it should be an offence "for any person to disclose the identity of a protected person..."(106)

The Health and Welfare report proposes maintaining separate detailed records on all parties to artificial insemination. The record on the donor would contain "all relevant and available information." Separate records would be kept that "document the history and the physical, laboratory and follow-up data on the couple and the progeny."(107) The Committee does not recommend that these records be linked until provincial legislation is passed that would protect the donor from unfounded or

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(103) Ibid., paragraph 4.21.

(104) Ontario Report (1985), recommendation 22.(4).

(105) Ibid., recommendation 22.(7)(a).

(106) Saskatchewan Report (1981), recommendations 12(a)(i), 12(b).

(107) Health and Welfare Report (1981), recommendation 3.1.

frivolous legal action.(108) The Committee does not identify any similar potential need to protect the recipient or her offspring from frivolous or unfounded legal action, such as a paternity claim launched by a sperm donor.

H. Donor Control over His or Her Gametes

The practice of donating gametes or embryos for immediate use or for storage has raised questions concerning the donor's control of his or her genetic material; the length of time gametes or embryos can be stored; and decisions about control over fertilized material belonging to a couple who die, divorce or no longer intend to use their stored embryos.

The Warnock Committee does not concede any rights or obligations to donors of eggs or semen if their donations have been made to treat other persons or for research. The ultimate decision concerning the disposal of these gametes rests with the storage authority. This Committee notes that disposal problems potentially arise when a couple stores eggs, semen or embryos for their own use. With respect to egg and semen deposits, the Committee recommends an automatic five-year review of the deposits. Further, if the couple die or cannot be traced, the use or disposal of frozen gametes should pass to the storage authority.(109)

With respect to frozen embryos, the Warnock Committee's recommendations on storage time, use and disposal are derived from the position that "ownership of embryos is undesirable." Indeed, the Committee recommends that "legislation be enacted to ensure there is no right of ownership in a human embryo."(110) In light of this position, the Committee recommends if a couple cannot reach an agreement on how the

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(108) Ibid., recommendation 3.2.

(109) Warnock Report (1984), paragraph 10.8.

(110) Ibid., paragraph 10.11.

embryo should be used,(111) or if they die,(112) the use or disposal should pass to the storage authority. If one of a couple dies, the use or disposal would pass to the survivor. And a maximum of 10 years for storage is recommended, with the storage authority determining use or disposal after that time period.

The Ontario Law Reform Commission would allow the donor to determine the specific use of his or her gametes at the time of donation.(113) However, subject to this recommendation, the donor would have no right in law over the use or disposal of a fertilized ovum (an embryo) to which he or she had contributed his or her genetic material.(114) As well, the donor could request that his or her gametes be disposed of or returned after they had been donated as long as they had not been used in a fertilization procedure.(115)

The Ontario Commission also recommends that an embryo created with the ova and sperm of the intended recipient and her husband or partner "should be under the joint control of the man and woman."(116) Like the Warnock Committee, the Ontario Law Reform Commission would pass control to the survivor, should one of the couple die, and if both should die or fail to agree on the use or disposition of the fertilized ovum, "legal control should pass to the physician, clinic, gamete bank, or other authority that has actual possession of the ovum."(117) Regarding the storage time for embryos, the Commission sets it at a maximum of 10 years.

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(111) Ibid., paragraph 10.13.

(112) Ibid., paragraph 10.12.

(113) Ontario Report (1985), recommendation 13.

(114) Ibid., recommendation 27.(2)(a).

(115) Ibid., recommendation 14.(1).

(116) Ibid., recommendation 27.(1)(a).

(117) Ibid., recommendation 27.(1)(b),(c).

Beyond that time, "the storage authority should be under a duty to have the ovum wasted."(118)

The Council of Europe advocates that if the donor dies or cannot be located, his or her gametes should be destroyed when the storage term expires.(119)

I. Experimentation on *In Vitro* Embryos

IVF has allowed embryos to be created in a laboratory and for unimplanted or spare embryos to be used for experimentation and research. Some argue that no research should be carried out. Others believe that this research is critical to develop an understanding of human development and to correct problems in human infertility. Research on embryos raises concerns for some who believe that an embryo is "potential life" that should be respected. Others would countenance the practice as long as it is done for therapeutic purposes.

The Ontario Law Reform Commission would allow both research and experimentation on a pre-implanted embryo(120) with the proviso that it "be restricted to research centres approved by the Ministry of Health."(121) Further, if experimentation that does not have a therapeutic purpose is carried out on an embryo, the Commission recommends that the embryo not be transferred to a woman."(122)

Council of Europe principles forbid the creation of embryos for research purposes and allow research on embryos only if such research can be shown to benefit the embryo. The Council maintains that member countries may conduct research on condition that the research have "preventive, diagnostic, or therapeutic purposes for grave diseases of the

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(118) *Ibid.*, recommendation 32.

(119) U.S. Congress Office of Technology Assessment (1988), p. 356.

(120) Ontario Report (1985), recommendation 29.(1).

(121) *Ibid.*, recommendation 29.(2).

(122) *Ibid.*, recommendation 30.

embryo." As well, "other methods of achieving the purpose of the research must have been exhausted." Further, no experimentation may be conducted beyond 14 days after fertilization, the donating couple must have consented to the research, and the research must have the approval of a multi-disciplinary ethics committee.(123) After 14 days, implantation of the embryo in the uterus of the mother occurs.

The Warnock Committee recommends criminal sanctions for the "unauthorized use of an *in vitro* embryo."(124) Like the Council of Europe, it recommends that the cutoff point for authorized research be 14 days after fertilization "but subject to all other restrictions as may be imposed by the licensing body."(125) They would make it a criminal offence to handle a human embryo or use it for research beyond 14 days of development.(126) And, as the Ontario Law Reform Commission recommends, an embryo that had been the subject of research should not be transferred to a woman.(127)

The Canadian Medical Research Council comments that it sees "a broad prohibition of all research on embryos as neither justified nor wise." For the Council, "the purpose of the intended research is a critical element in deciding whether embryo research is acceptable." It recommends that acceptable research should be "research directed toward improvement of infertility management." Further, it would countenance research on embryos up to 14 to 17 days of development.(128)

The Canadian Law Reform Commission notes that it will give detailed consideration to the *ex utero* embryo in a forthcoming working

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(123) U.S. Congress Office of Technology Assessment (1988), p. 356.

(124) Warnock Report (1984), paragraph 11.18.

(125) *Ibid.*, paragraph 11.30.

(126) *Ibid.*, paragraph 11.22.

(127) *Ibid.*

(128) Medical Research Council, *Guidelines on Research Involving Human Subjects*, Ottawa, 1987, p. 34-35.

paper. In its 1989 report, it states that the law should permit embryo disposal and limited research. Experimentation is acceptable, according to the Commission, on "utilitarian grounds - increased knowledge of human life, benefit to childless couples, development therapy for other afflicted foetuses and embryos."(129) It would impose the following conditions on embryo research: the donors must have given their consent at the time of donation; research would be proscribed after 14 days of embryonic development; and the purpose of the research would be medical and not commercial. With respect to regulation over embryo research, the Commission regards criminal law as only a partial response and envisions regulations in the form of national research guidelines or a statute governing embryo and fetus research.(130)

J. Sex Selection

The two commissions of inquiry that addressed the issue of sex selection focused on the selection of the gender of pre-implanted embryos. Such selection has been made possible as a result of the IVF procedure. Of concern to women are the possible impact of the practice on the male to female ratio in society if it is used in general to produce male offspring, and the implications for the social value of women.

The Ontario Law Reform Commission points out that some would regard the disclosure of information about the sex of embryos to be medically beneficial in cases where inheritance of a sex-linked genetic trait is involved. In other cases, such as sex selection solely for social reasons, the practice is regarded as offensive, particularly because of the "perceived cultural bias in favour of males." The Commission adopts the position that participants in IVF "have a right of access to material information at all times, since the principle of informed consent as a continuing condition of medical care underlies IVF no less than any other

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(129) Law Reform Commission of Canada, Crimes Against the Foetus, Working Paper 58, 1989, p. 59.

(130) Ibid., p. 60.

medical procedure."(131) In light of this inviolable right and the questionable enforceability of legislating against sex selection of pre-implanted embryos, the Commission recommends that no legislation be enacted to address the issue.(132)

The Warnock Committee considered the practice of sex selection as a clinical procedure and the impact of the procedure on the ratio of males to females in a society that uses it for social reasons. It concludes that it was not possible to make any recommendations because of the difficulty of predicting "the outcome of any such trend ... [and] that the whole question of the acceptability of sex selection should be kept under review."(133)

The Council of Europe proposes an explicit prohibition on selecting sex or special characteristics through artificial conception procedures.(134)

K. Surrogate Motherhood

As noted earlier, this is a reproductive arrangement rather than a reproductive technology. Where it is permitted by law, however, it raises many concerns identical to those identified with the aforementioned reproductive technologies. They include eligibility criteria and screening; payment; anonymity; and social and legal relationships of offspring to surrogate and social parents. Of the reports reviewed, only the Ontario Law Reform Commission recommends that surrogate mother contracts be allowed.

The Council of Europe would allow surrogate arrangements "only if the surrogate does not receive material compensation." Otherwise,

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(131) Ontario Report (1985), p. 207.

(132) Ibid.

(133) Warnock Report (1984), paragraph 9.11.

(134) U.S. Congress Office of Technology Assessment (1988), p. 356.

the Council proposes that "contracts for surrogate motherhood should be unenforceable and intermediaries and advertising should be forbidden."(135)

The Warnock Committee advocates legislation to criminalize the creation or the operation of for-profit and non-profit agencies "whose purposes include the recruitment of women for surrogate pregnancy or making arrangements for individuals or couples who wish to utilize the services of a carrying mother."(136) Private arrangements would not be criminalized, but the legislation would render "all surrogacy contracts illegal and unenforceable in the courts."(137)

In contrast, the Ontario Law Reform Commission recommends legislation that would allow surrogate motherhood contracts to be regulated by the provincial government and recognized by the courts. The Commission makes some 32 recommendations on how such arrangements would be regulated. Among the requirements:

- approval of the contract by the court before the artificial conception procedure commences;
- a medical need that is not amenable to alleviation by other means;
- an assessment of the marital status as well as stability of the prospective parents;
- the prospective surrogate should have reached age of majority;
- an assessment of surrogate's physical and mental health, marital and domestic circumstances, opinion of her spouse or partner, and impact of the arrangement on the children under her care to determine her suitability;
- separate legal representation for the surrogate and contracting couple;

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(135) Ibid.

(136) Warnock Report (1984), paragraph 8.18.

(137) Ibid., paragraph 8.19.

- preservation of the anonymity of prospective social parents and the surrogate and confidentiality of court records;

- immediate surrender of the child born to surrogate mother to the social parents and, if necessary, provisions in the contract to make an order for transfer of custody at birth;

- provisions in the arrangement to deal with the contingency that the newborn is handicapped;

- recognition upon birth of the social parents as parents for all legal purposes and no legal relationship of the surrogate to the child;

- the names of the social parents as the mother and father on the birth registration;

- regulation of any agencies in the business of arranging services surrogacy contracts by the Ministry of Community and Social; and

- prior approval of the court before payment is made - the amount to be paid and the expenses covered to be determined by the court.(138)

L. Research

There is a paucity of information on the factors contributing to infertility, its prevalence and the outcome of reproductive services. As well, there are few data on what activities or programs exist for prevention and control of sexually-transmitted diseases and infertility and the nature of support for such activities. Systematically-collected follow-up data are also unavailable on the development and health of IVF and embryo transfer offspring. Some of the reports have included recommendations to establish a national program of research to alleviate this lack of information.

The Warnock Committee expresses surprise at how limited the data for the United Kingdom are on the incidence of infertility, the

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(138) Ontario Report (1985), recommendations 35, 38, 39, 41, 43, 45, 48, 49, 51, 52, 53, 56, 58, 60.

availability of existing services, and the number of women and couples treated for infertility problems. It notes the need for information if planners and policymakers are to make informed decisions and recommended "that funding should be made available for the collection of adequate statistics on infertility and infertility services."(139)

The Office of Technology Assessment (OTA) proposes a number of options for the collection of data on reproductive health and infertility prevention. It proposes a federal initiative to collect data on infertility and to establish a systematic method for registering the birth of IVF babies and for following their development and health. The OTA acknowledges the relationship between sexually-transmitted diseases and infertility and recommends appropriating federal funds for state public health departments to establish a national surveillance system on chlamydial infection. Currently in the United States, chlamydial infection is not a reportable sexually-transmissible disease. It also recommends extending the program of grants for prevention and control of sexually-transmitted diseases to include prevention of infertility caused by sexually-transmitted diseases. Other options include evaluation of federal efforts to prevent infertility and enhanced education in reproductive health.(140)

M. Information Provided to Infertility Consumers

This issue was considered only by the Office of Technology Assessment. Infertile women and couples who undergo assisted conception treatments do so because of a desire to reproduce. Some infertile people are desperate to have a child, in part because of the social emphasis on the importance of motherhood. The literature indicates that recipients of some of the reproductive technologies are not given full and accurate information related to both risks and success rates. This information is essential if the client is to make informed choices about whether to start

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(139) Warnock Report (1984), paragraph 2.14.

(140) U.S. Congress Office of Technology Assessment (1988), p. 16-18.

infertility therapy and when to give it up. Ethical questions have arisen over the exploitation of those who undergo treatments that may be non-beneficial and even detrimental to their quality of life.

The OTA recommends encouraging the use of a consensus review by professional medical societies on the use of IVF, gamete intrafallopian transfer, and other innovative treatments for infertility. Another option it proposes is to extend consumer protection laws to selected infertility services.(141)

SOME UNEXPLORED ISSUES IN THE WARNOCK AND ONTARIO REPORTS

Some commentators have labelled the committee reports on reproductive technology as too narrowly focused. The reports prepared by the Warnock Committee and the Ontario Law Reform Commission cover a broad range of issues and, indeed, are considered to be comprehensive reviews of the subject. Critics of these reports have, however, pointed out that they give minimal or no consideration to other, equally important, issues. Advocates of a royal commission on reproductive technology in Canada have also identified certain issues that should be considered in such a study that were not included in the United Kingdom and Ontario reports.

A. Impact of Reproductive Technology on Women

Men and women are equally likely to experience infertility, yet all of the techniques to assist conception are carried out on women. The implications of this for women have not been addressed in the reports. One critic raised the following query: "What are they saying about women's bodies, where reproduction takes place? I found no women as the subject of human reproduction in ... any of the reports."(142)

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(141) Ibid., p. 19-20.

(142) P. Spallone, "Reproductive Technology and the State: The Warnock Report and its Clones," Made to Order: The Myth of Reproductive and Genetic Progress (1987), p. 168.

B. Ethics of Experimental Reproductive Technologies

A related issue is that some of the infertility therapies are considered to be more experimental than therapeutic. The medical and emotional long-term consequences of having undergone infertility treatments are unknown. Yet concerns raised by the committees on the ethics of research and experimentation refer only to the embryo; there were no recommendations on the ethics of experimentation on women's bodies.(143)

C. Consumer Information

The quality and quantity of information provided by clinics operators to consumers of infertility therapies was not addressed by the Ontario Law Reform Commission or the Warnock Committee. Accurate and complete information is necessary if those experiencing the pain of infertility are to make an informed decision to pursue a particular reproductive treatment. The Canadian Coalition for a Royal Commission on New Reproductive Technologies developed draft principles as a basis for the development of appropriate policies and potential legislation. One of the principles is a call for the development and enforcement of "stringent criteria as to what constitutes informed consent/decisionmaking."(144)

D. Causes and Prevention of Infertility

With the exception of the Office of Technology Assessment report, there is no discussion in the reports of the known causes of infertility or of prevention options. The focus on "cures" for infertility by science and medicine deflects attention away from some of the public health-oriented approaches to the problem that include education, early

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(143) Ibid.

(144) Canadian Coalition for a Royal Commission on New Reproductive Technologies, "Draft of Principles for the Use of New Reproductive Technologies," November 1987.

diagnosis and treatment.(145) The principle developed by the Canadian Coalition for a Royal Commission on New Reproductive Technologies on infertility prevention states: "everybody has the right to an environment free of agents which create and contribute to infertility."(146)

E. Reproductive Research

A royal commission on reproductive technology would be well served by comprehensive and systematically-collected information on the issues under study. A system for data collection and analysis of the outcome of infertility treatments would provide immediate and ongoing information to medical practitioners, policymakers and consumers. The reports reviewed contain limited and unsystematically-collected data on the incidence of infertility, the demand for, and the availability, costs, and success of infertility treatments. In a 1989 resolution of the National Association of Women and the Law (NAWL) that gives support to the creation of a royal commission on reproductive technology, NAWL recommends that "the Commission establish an independent research program and, in particular, commission and conduct research on all aspects of new reproductive technologies in a non-sexist manner."(147) A principle proposed by the Coalition states that "national standards must be set for compulsory short-term and long-term follow-up of all reproductive technologies."(148)

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(145) Andrews (1988), p. 260-262.

(146) Canadian Coalition for a Royal Commission on New Reproductive Technologies (November 1987).

(147) National Association of Women and the Law, "Reproductive Issues - Reproductive Technology," Resolution 1989 (16).

(148) Canadian Coalition for a Royal Commission on New Reproductive Technologies (November 1987).

CONCLUSIONS

This paper has focused on the reproductive technologies developed to assist individuals and couples who are infertile or who wish to prevent the transmission of a genetic disease to their offspring. It has reviewed some of the social, legal and ethical issues the technologies raise for women, couples, donors, offspring, embryos, the medical profession and the government. Some of these issues have been considered by government-sponsored commissions of inquiry, resulting in recommendations for governing and regulating the technologies.

The concerns and issues raised by the techniques of assisted conception are many. They are related to the technologies themselves, the social arrangements and relationships that are shaped by the technologies, and bodily self-determination and control. According to the Canadian Coalition for a Royal Commission on New Reproductive Technologies, "science is moving faster than our ability to grapple with the social implications these new technologies present." The Coalition regards a royal commission as the best forum to achieve "public education, debate and resolution" to explore the social issues surrounding these new technologies and to determine what limits should be imposed on them.

GLOSSARY OF TERMS (149)

Artificial insemination (AI): The introduction of sperm into a woman's vagina or uterus by noncoital methods, for the purpose of conception.

Cervical mucus: Mucus produced by the cervix that undergoes complex changes in its physical properties in response to changing hormone levels during the reproductive cycle. These changes assist the survival and transport of sperm.

Chlamydia: An STD caused by the bacteria Chlamydia trachomatis. In women, chlamydial infection accounts for 25% to 50% of the pelvic inflammatory disease cases seen each year. Chlamydia is the most common STD in the United States today.

Chromosome: A rod-shaped body in a cell nucleus that carries the genes that convey hereditary characteristics.

Cryopreservation: The preservation of sperm, embryos and oocytes by freezing them at extremely low temperatures.

Diagnostic tests: Tests performed to evaluate reproductive health. In women, this can involve indirect indicators (menstrual irregularity, hormone levels, cervical mucus) and direct ones (tissue biopsy, laparoscopy, ultrasound). In men, tests include semen analysis, endocrine evaluation, testicular biopsy, and evaluation of sexual dysfunction.

Donor gametes: Eggs or sperm donated by individuals for medically-assisted conception.

Ectopic pregnancy: A pregnancy that occurs outside the uterus, usually in a fallopian tube.

Embryo: Term used to describe the stages of growth from the second to the ninth week following conception. During this period, cell differentiation proceeds rapidly and the brain, eyes, heart, upper and lower limbs, and other organs are formed.

Embryo donation: The transfer from one woman to another of an embryo obtained by artificial insemination and lavage or, more commonly, by IVF.

Embryo lavage: A flushing of the uterus to recover a preimplantation embryo.

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(149) The following glossary was derived from the U.S. Congress Office of Technology Assessment (1988), p. 383-388.

Embryo transfer: The transfer of an *in vitro* fertilized egg from its laboratory dish into the uterus of a woman.

Endometriosis: The presence of endometrial tissue (the normal uterine lining) in abnormal locations such as the fallopian tubes, ovaries, or the peritoneal cavity. Endometriosis can interfere with nearly every phase of the reproductive cycle and is a leading contributor to infertility in women. The causes and development of endometriosis are incompletely understood.

Experimental technology or treatment: A technology or treatment the safety and efficacy of which has not been established.

Fallopian tube: Either of a pair of tubes that conduct the egg from the ovary to the uterus. Fertilization normally occurs within this structure. Blocked or scarred fallopian tubes are a leading source of infertility in women.

Fertility drugs: Compounds used to treat ovulatory dysfunction. These include clomiphene citrate, human gonadotropins, bromocriptine, glucocorticoids, and progesterone.

Fertilization: The penetration of an oocyte by a sperm and subsequent combining of maternal and paternal DNA.

Fetus: The embryo becomes a fetus after approximately nine weeks in the uterus. This stage of development lasts from nine weeks until birth and is marked by the growth and specialization of organ function.

Gamete: A reproductive cell. In a man, the gametes are sperm; in a woman, they are eggs, or ova.

Gamete intrafallopian transfer (GIFT): A technique of medically-assisted conception in which mature oocytes are surgically removed from a woman's body and then reintroduced, together with sperm, through a catheter threaded into the fallopian tubes, where it is hoped fertilization will take place.

Gonorrhea: An STD caused by the bacteria *Nesseria gonorrheae*. If the infection is not treated in women, it can spread to the uterus and the fallopian tubes, causing PID. In men, it can cause epididymitis and can affect semen quality.

Implantation: The process by which the fertilized oocyte (zygote) becomes attached to the wall of the uterus (endometrium).

In vitro: Literally "in glass"; pertaining to a biological process or reaction taking place in an artificial environment, usually a laboratory.

In vitro fertilization (IVF): A technique of medically-assisted conception (sometimes referred to as "test tube" fertilization) in which mature oocytes are removed from a woman's ovary and fertilized with sperm in a laboratory (see "embryo transfer").

In vivo: Literally "in the living"; pertaining to a biological process or reaction taking place in a living cell or organism.

In vivo fertilization: The fertilization of an egg by a sperm within a woman's body. The sperm may be introduced by artificial insemination or by coitus.

Infertility: Inability of a couple to conceive after 12 months of intercourse without contraception.

Intracervical insemination: Artificial insemination technique in which sperm are placed in or near the cervical canal of the female reproductive tract, using a syringe or a catheter, for the purpose of conception.

Intrauterine device (IUD): Contraceptive device inserted through the cervix into the uterine cavity.

Laparoscopy: Direct visualization of the ovaries and the exterior of the fallopian tubes and uterus by means of a laparoscope (a long, narrow, illuminated instrument) introduced through a small surgical incision below the navel, to evaluate any abnormalities. Surgical procedures may also be performed using this method.

Menstrual cycle: The process of ovulation in which an oocyte matures each month in a follicle produced on the surface of the ovary. At ovulation, the follicle ruptures and the oocyte is released into the body cavity and enters the fallopian tube. If fertilization and implantation do not occur, the uterine lining is sloughed off, producing menstrual flow. The normal menstrual cycle is about 28 days.

Noncoital reproduction: Reproduction other than by sexual intercourse.

Oocyte: The female egg or ovum, formed in an ovary.

Ovaries: Paired female sex glands in which ova are developed and stored and the hormones estrogen and progesterone are produced.

Oviduct: Fallopian tube.

Ovulation: The discharge of an oocyte from a woman's ovary, generally around the midpoint of the menstrual cycle.

Ovum (pl. ova): The female egg or oocyte, formed in an ovary.

Ovum donor: A woman who donates an ovum or ova to another woman.

Pelvic inflammatory disease (PID): Inflammatory disease of the pelvis, often caused by an untreated STD. Bacteria that cause gonorrhea, chlamydia, or other infections can ascend from the lower genital tract through the endometrium (causing endometriosis), to the fallopian tubes (causing salpingitis), and possibly to the ovaries (causing oophritis).

Preimplantation embryo: The mass of dividing cells of the zygote and the blastocyst that develop in the first six to seven days after fertilization.

Semen: A fluid consisting of secretions from the male's seminal vesicles, prostate, and from the glands adjacent to the urethra. Semen carries sperm and is ejaculated during intercourse.

Semen analysis: Evaluation of the basic characteristics of sperm and semen, such as appearance, volume, liquefaction and viscosity, and sperm concentration and motility. The presence of bacterial infection and immunological disorders can also be determined by semen analysis. It is the fundamental diagnostic method used to evaluate male infertility.

Sexually transmitted diseases (STDs): Infectious diseases transmitted primarily by sexual contact, including syphilis, gonorrhea, chlamydia, herpes, and acquired immunodeficiency syndrome.

Sperm: The male reproductive cell, or gamete. Normal sperm have symmetrically oval heads, stout midsections, and long tapering tails.

Sperm bank: A place in which sperm are stored by cryopreservation for future use in artificial insemination.

Sperm motility: The ability of a sperm to move normally.

Sperm washing: The dilution of a semen sample with various tissue culture media in order to separate viable sperm from the other components of semen.

Surrogate gestational mother: A mother who gestates and carries to term an embryo to which she is not genetically related, with the intention of relinquishing the child at birth.

Surrogate mother: A woman who is artifically inseminated and carries an embryo to term, with the intention of relinquishing the child at birth.

Testes: Also known as the testicles, the paired male sex glands in which sperm and the steroid hormone testosterone are produced.

Ultrasound: The use of high-frequency sound waves focused on the body to obtain a video image of internal tissues, organs and structures. Ultrasound is particularly useful for in utero examinations of a developing fetus, for evaluation of the development of ovarian follicles, and for the guided retrieval of oocytes for IVF and GIFT.

Uterine lavage: A flushing of the uterus to recover a preimplantation embryo.

Zygote: A fertilized oocyte formed by the fusion of egg and sperm, containing DNA from both.